



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

SCIENCE:

A WEEKLY NEWSPAPER OF ALL THE ARTS AND SCIENCES.

PUBLISHED BY

N. D. C. HODGES,

47 LAFAYETTE PLACE, NEW YORK.

[Entered at New York Post-Office as second-class mail-matter.]

SUBSCRIPTIONS.—United States and Canada.....\$3.50 a year.
Great Britain and Europe..... 4.50 a year.

Science Club-rates for the United States and Canada (in one remittance):

1	subscription 1 year	\$ 3.50
2	" 1 year	6.00
3	" 1 year	8.00
4	" 1 year	10.00

Communications will be welcomed from any quarter. Rejected manuscripts will be returned to the authors only when the requisite amount of postage accompanies the manuscript. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guaranty of good faith. We do not hold ourselves responsible for any view or opinions expressed in the communications of our correspondents.

VOL. XIII.

NEW YORK, FEB. 8, 1889.

No. 314.

CONTENTS:

THE THORNE TYPE-SETTING MACHINE.....	93	SOMETHING ABOUT TORNADOES	
THE STEAM-ENGINE, ITS PRINCIPLES, ETC. E. N. Dickerson	94	A RIVER-PIRATE W. M. D.	108
IMPROVED GASLIGHT.....	96	A POPULAR OBSERVATORY.....	109
THE NEW WESTON VOLTMETER.....	97	SCIENTIFIC NEWS IN WASHINGTON.	
ELECTRICAL NEWS.		Irrigation in California.....	110
Hertz's Researches on Electric Oscillations.....	99	The Nucleus of a "Zoo".....	110
Electric Plants in the Navy.....	100	Mounds of Ohio.....	110
The Axo Battery.....	101	Triple Births in the Human Race..	110
NOTES AND NEWS.....	101	The Talking-Machine in Use.....	110
EDITORIAL.....	102	Where Will It Go Next?.....	110
The New York Schools again. — International Copyright. — President Eliot's Annual Report.		BOOK-REVIEWS.	
SCIENCE AND THE DICTIONARY.....	103	The Teachers' Psychology.....	110
SPEECH AND ALPHABETICS		AMONG THE PUBLISHERS.....	111
A. Melville Bell	104	LETTERS TO THE EDITOR.	
		The Baconian Method in Science	
		Logicus	112

THE MANY KIND and appreciative words that our recent editorial comments on school matters have called forth are sufficient proof that we have succeeded in arousing an interest in this most important matter. Our Wednesday of last week the New York City Board of Education discussed the report of the committee on reform, but adjourned without taking any action. As we go to press, the matter is again under discussion. The character of the meeting of last week is now re-assuring. The "wrigsters" in the board received Mr. Webb's opening remarks in sullen silence, and, when finally one commissioner did find his tongue, it was to say that no marking system prevailed in New York city schools! This astounding statement is so transparently false, that we are quite at a loss to know why it was made. We can only interpret it as a sign that the opposition propose to treat the whole matter with an ignorant bravado. This attitude, however, will not be tolerated by the public nor by the independent section of the press. The question must be squarely met, and a vote must be taken. Another commissioner, one who knows nothing whatever about the schools as they now exist, proclaimed that they were perfect, and cited himself, a graduate of them, in evidence. This line of argument

will hardly be accepted as conclusive. The well-known fact is, that abuses of the most outrageous kind exist, — favoritism, political methods, bad teaching, and the rest, — and they are wasting the lives of hundreds of thousands of children. The Board of Education *must* cope with them.

THE AMERICAN [AUTHORS'] COPYRIGHT LEAGUE has issued an appeal, asking the support, by all interested, of the Chace-Breckinridge Copyright Bill, which passed the Senate May 10 by 34 to 10, and is now before the House of Representatives. This is a compromise measure, the outcome of years of labor. Whatever its defects, this bill, the league believes, "will put a stop to the habit of piracy; will free American authors from the competition with stolen goods; will enable American writers to support themselves by their pens; will make American books cheaper by opening to them the broad home market now supplied with inferior foreign work; will give American books a chance to reach the American people, who now read many worthless books by foreign authors, reprinted in rival editions solely because they can be had for nothing; will result in securing to American authors important and growing foreign markets; and will take from our country the stigma of being the only great nation in the world which despoils the foreign author."

In this connection it is interesting to note, that, according to the Washington correspondent of the New York *Evening Post*, "the friends of the Copyright Bill have a plan for bringing up the bill in the House which they hope will be successful. The plan is to have a rule reported that will cover this bill. The great difficulty has been to induce the Republicans to agree not to insist that any such rule shall be amended so as to make it in order to call up pension-bills for passage. The Democratic Representatives are determined to resist any further pension legislation in this Congress. Some of the Republicans think that they have made all the 'record' as to pensions that is necessary, and that it is expedient to pass the Copyright Bill. There was a dinner on Saturday night, Jan. 19, which was attended by Mr. Houghton of Boston, Edward Eggleston, and others interested in the copyright matter, and by some of the leading members of the House, including Messrs. Cannon of Illinois, Long of Massachusetts, Adams of Illinois. Some of the Western members have been influenced by the concentrated attack upon the bill that has been made by the American Press Association, which furnishes the country newspapers with patent insides. The friends of the bill are endeavoring to counteract this influence, and to answer the stereotyped petitions which have been sent to the country newspapers for signature. Dr. Eggleston reports that a large majority of members of Congress, who at the opening of the session found their mails crowded with bogus petitions purporting to come from typographers, have had their eyes opened to the fictitious nature of these petitions by the representatives of the typographical unions who have visited Washington to assure members that the unions are heartily in favor of the bill, and that the opposition is, so far as they can find out, supported and paid for by certain British publishers who are afraid to lose business if the bill becomes a law. The fact that the *Union Printer* of New York, edited by W. M. Rood, and which is the official organ of the typographical unions in that part of the country, is giving hearty support to the bill by editorial articles, and joining hands with the organ of Union No. 2 of Philadelphia, shows the spirit in which the members of the craft are taking hold of the matter."

THE ANNUAL REPORT of the president of Harvard College is always looked for with interest, and for some years past *Science* has made it a custom to call attention to this report as soon as it is issued. The report of 1887-88 is before us; and, while it contains no features of striking interest, yet it chronicles a steady progress

along the line which the authorities of Harvard have marked out for themselves. Appreciative reference is made to the work of Professors Asa Gray and Ernest Young, who died during the year, and also to Robert D. Smith and James Freeman Clarke, whom death removed from the board of overseers. Mr. Eliot notes the fact that in 1888 the examinations for admission to the college were for the first time conducted exclusively on the new plan announced in 1886. It seems that the secondary schools and the private tutors have already responded in considerable measure to the new suggestions and requirements of the faculty. Of the 315 candidates who completed their entrance examination in 1888, 31 presented the history of the United States and of England instead of the history of Greece and Rome; and 93 presented elementary experimental physics, as recommended by the faculty, instead of descriptive physics and astronomy. Both French and German were presented by 110 candidates. The figures prove that the new requirements have already stimulated the teaching of modern languages in secondary schools, and have promoted the introduction of laboratory methods of studying physics and chemistry. It is pointed out that in the progress of converting Harvard College into a university of liberal arts and sciences, about the same gain was made in 1887-88 as in each of the years immediately preceding. "Progress," says President Eliot, "may be made in one or more of four principal directions: (1) in amplitude of instruction; (2) in freedom in choice of studies; (3) in better arrangement and co-ordination of studies within single departments; and (4) in *morale*." The gain in the volume of instruction during the year 1887-88 was about five per cent; that is, from 485 hours a week to 510 hours. In respect to freedom in choice of studies, the freshmen gained access to several departments from which they had previously been excluded; namely, Spanish, Italian, and music. President Eliot holds that it is to the advantage of every department that its elementary studies be open to freshmen, because otherwise the advanced courses of the department might not be reached in due season. In respect to co-ordination of courses, there was an entire recasting of the whole set of courses in physics, with the result of securing a better sequence of subjects and a more complete covering of the ground. Additional facilities were afforded for taking up advanced study and research in German and in Romance philology.

The *morale* of the college has been favorably affected by several causes. The voluntary method in the religious services gives satisfaction to teachers and students. "It meant the permanent removal of the question of conscience, and the drying-up of a constant source of irritation and ill feeling, and the reparation of what many believed to be a grave injury to religion, and the establishment at the heart of the university of a fresh, strong influence for good." Under a new regulation, also, the instructors have the power to exclude from their courses any students who neglect the work required of them. This power has been extensively used, and as a result the discipline and the progress of the students have improved. The question of athletics has been settled to the satisfaction of every member of the university, and Mr. Eliot adds of the faculty, "that they hold that dyspepsia is less tolerable than a stiffened knee or thumb, and that effeminacy and luxury are even worse evils than brutality." We notice, also, an interesting remark in this report regarding the physical condition of students holding scholarships. It seems that the college is now paying out more than fifty thousand dollars a year to students who need aid to complete their education. Heretofore it has been usual to pay no attention to the bodily condition of the recipients of this beneficiary aid, and it is believed that these recipients fall below the average of the whole body of students in health and vitality. It is now provided that holders of scholarships shall present themselves twice in the year to the director of the gymnasium to be examined as to their physical condition, and to receive suggestions as to the care of their health. The summer courses, the library, and the professional schools are all touched upon, and valuable information is contained in the appendices.

SCIENCE AND THE DICTIONARY.

ONE of the most important accompaniments of the progress of science, indeed an essential factor in it, is the increase of its vocabulary. Every advance in accurate observation, discovery, analysis, or constructive theory, brings with it a new term, or, more often, a group of terms. This multiplication of words is largely inevitable. The new things must, of course, generally receive new names, and the new ideas will not always fit into the frames of association in which the old words are set. The scientific demand for precision and brevity must be satisfied even if linguistic purity suffers. It thus happens that every year the language of science receives a large addition which students of science must understand and use. How very large, this increment is, it is difficult, even for those who are familiar with several departments of science, to appreciate. Moreover, the process of growth does not stop with what is necessary. Unfortunately, the liberty which in many cases must be taken with the language has led many reputable scientific men to feel that they are free to do what they please with it, in any case. The result is a vast number of coinages which might have been dispensed with, but which must be learned and remembered, since they often become current through the reputation of their inventors. The number of such words increases at the rate of probably several thousand a year.

To this increment through direct coinage must also be added the numerous, and not less significant, specializations and enlargements of the meaning of established and even common words, such as "energy" and "potential." Every movement in science unsettles much that has been done before, and of this continuous re-adjustment its language is a true reflection.

It is obvious that at this point science can receive a great deal of help from competent lexicographic aid. While the dictionary is not, in many respects, an adequate exponent of scientific knowledge, it may be an invaluable record of the greater number of the elements or details of that knowledge. Its aim is, of course, necessarily to state merely what is or has been in the language it describes, not what scientifically ought to have been; but, if it is accurately and intelligently performed, this historical labor approaches in its value to science very near to original work. It is true, also, that the utility of the ordinary dictionary is limited by the narrowness of its definitions and the formalism which marks its treatment of its material; but these defects are largely conventional, and it is quite possible for an editor who understands the wants to be met, and who has the necessary disregard of traditions, to model a dictionary which will satisfy every reasonable scientific demand. In a word, the impossibility now felt of keeping track of the linguistic development not only of science as a whole, but even of one specialty, and the difficulty of guarding even established words from misuse or abuse, make the construction of a dictionary which will not only record the entire vocabulary of the sciences, but will record it and define it so fully and accurately as to conform to the needs of scientific men, one of the most urgent requirements of the time. It is therefore worthy of note that the attempt has been made in this country, and by American scientists, to produce a book of this kind. It is announced that the "Century Dictionary," which has been for some years preparing, under the editorship of Professor W. D. Whitney, is to be not merely a complete general and historical dictionary of common English, but also an equally complete dictionary of technical terms; and that this technical material, which has been obtained by searching all branches of scientific literature, has been put into shape by competent specialists, who have had in mind the necessities of their fellow-craftsmen, as well as the wants of laymen. It appears, thus, that an effort is seriously making to embody for the first time comprehensively, in lexicographic form, the scientific spirit and work of the nineteenth century; and while it is to be expected that the most direct result of the attempt will be the promoting of popular intelligence, it is also to be expected — from the reputation of the distinguished editor-in-chief and of his co-laborers, among whom are Professor J. D. Whitney, Professor E. S. Dana, Dr. Sereno Watson, Dr. Lester F. Ward, Professor C. S. Peirce, Professor T. C. Mendenhall, Professor R. H. Thurston, Dr. Elliott Coues, Professor Theodore Gill, and many others — that the interests of pure science will not be neglected.